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National Workshop on Technology
Transfer Policies and Planning

Kuala Lumpur, Malaysia, 12-14 December 1983

DRAFT REPORT*

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I. RECOMMENDATIONS

Having considered the various papers prepared, the points of views presented by the Panel of speakers and the discussions that followed, the Workshop agreed to propose the following recommendations for consideration by the relevant Government authorities.

Technology Policies and Plans

1. A total planning system on science and technology must be developed by the Government authorities to ensure that the co-ordination of efforts on the implementation of the national industrial development plans and programmes be made effective. Such total planning system should specifically focus on important, basic problems such as institutional infrastructure development, human resources development, strengthening of R+D capacities and capabilities and an effective information system, tailored to support the specific needs at various levels and priority areas, with a proper time perspective, priority ratings and adequate support of financial and other resources.

2. A financial policy to support the development of the necessary infrastructure and the manpower development for the implementation of the technology plan has to be formulated and put into action by the Government. Such financial policies should be oriented towards encouragirg also the development of R+D innovations and inventiveness as well as to provide adequate rewards for development and application of appropriate indigenous technologies.

Institutional Infrastructure

3. The relevant Government authorities should review the existing institutional infrastructure which forms a total package for responding to the requirements for technology transfer process. As to the institutions which already exist, their deficiencies as well as potentials should be closely examined towards forming an effective institutional infrastructure necessary to serve the needs.

4. Meanwhile, the present evaluation system for technology transfer agreements should be strengthened, particularly regarding the technology aspects, utilising the expertise available through specialists from the research institutions as well as from the universities.

Human Resource Development

5. It is recommended that a review on the education policy be carried out in order to ensure that such a policy responds to the manpower requirements emerging from the overall industrialization programme. It is proposed that the number of engineering graduates be increased to correspond to the ratio of 30/Arts, 40/Science and 30/Engineering. Simultaneously, due emphasis must be given to the training of middle-level managers and technicians, to ensure that the implementation, among others, of the Industrial Master Plan will be successful. In-house technological capabilities is an important factor to be further developed to ensure that the country will have the desired level of expertise in order to absorb the technologies that are to be imported. In this connection, it is recommended that a centre of advanced technology be developed to build-up the necessary minimum core group to monitor the developments and their implications to the country.

Research and Development

6. It is fundamentally important to seek ways and means of developing indigenous technologies. In this respect, it is necessary to carry out series of actions which include, inter alia:

   a. identification of technology needs supportive to the total national industrial development programme;
   b. establishment of a mechanism for the absorption and adaptation of technologies as well as extension services for their promotion;
   c. creation of technology transfer centres modelled on the Korean Technology Advancement Corporation (KTAC), or the Japan Research Development Centre (JRDC), with a view to promote the commercialization of research results;

d. setting-up of an effective engineering consultancy services; and

e. consideration on reforming R+D incentives that already exist as well as exemption of double taxation of royalties.

In this connection, comparative studies should be carried out on the incentive systems of other developing countries. For example, in the Republic of Korea, through incentive schemes such as Technology Promotion Law, the Engineering Consultancy Promotion Law, the Technology Development Fund, etc., the research and development is being promoted.

Information

7. A national technological information network system should be developed, possibly linked with existing global and regional systems such as the UNIDO-INTIB, to ensure an effective mechanism for collecting and disseminating information which respond to the needs of the policy makers, the entrepreneurs, researchers, scientists and other parties. It is important to set-up information feedback system from the information users in order to formulate effective policies and plans. Technology transfer centres should act as a pumping mechanism to ensure that necessary technology information flow will be maintained between the centres of technology information and institutions or parties requiring the information. When concluding technology transfer agreements regardless of whether undertaken by the Government or industries, it is necessary that R+D, training, technical, marketing and other information be incorporated as an integral part of the agreements.

II. INTRODUCTION

A. Background Information

The strengthening of technological capabilities at the national-level of the developing countries has been a priority subject specifically focused on at the United Nations Conference on Science and Technology for Development. The Vienna Programme of Action on Science and Technology for Development adopted at that Conference, indicates the need for creating a comprehensive and integrated set of policy measures and programmes to enable the developing countries to promote the capability of technological self-reliance at the national level.

The Government of Malaysia, fully recognizing the important role which science and technology plays in the overall national economic and industrial development, has emphasized the building-up and strengthening of the scientific and technological capabilities in the country as a priority development target for the coming years. In this connection, the National Council for Science and Technology has emphasized their interest to receive UNIDO's support in organizing a National Workshop in order to deal with this problem in a systematic manner.

UNIDO's experience in the past in organizing a number of workshops with similar purpose and nature, in such countries as Bangladesh, Cameroon, the Dominican Republic, Guyana, Senegal, Sudan, etc., was considered as an effective means of stimulating the awareness of problems of technology transfer, development and management, particularly among the decision-makers and the senior officials at the managerial levels in the Government, public and private enterprises, organizations and associations, scientific and technological institutions, development banks and financing institutions, as well as universities and other organizations.

The workshop on technology transfer policies was jointly organized by the Ministry of Science, Technology and Environment, the Co-ordinating Council for Industrial Technology Transfer, SIRIM and UNIDO.

B. Objectives

The overall objective of the Workshop was to assist the Government of Malaysia in promoting their industrial technology development policies and programmes through systematic identification and analysis of the problems associated with the development, transfer and management of technology at the national level, and to develop a comprehensive set of technology policies aimed at strengthening the scientific and technological capabilities in the country for contributing effectively and efficiently to the economic and industrial development of the country. More specifically, the project is expected to provide a venue to discuss, in the form of brain-storming sessions, and seek to agree upon a set of possible ways and means to

a. create awareness of technology transfer problems among decision-makers and senior officials in the Government as well as various public and private enterprises, organizations, institutions and universities, and to identify appropriate measures to cope with these problems;

b. identify and pave way for organizing an efficient and systematically integrated network in order to facilitate effective transfer and management of industrial technologies;

c. draw attention to and increase the awareness on the implications of the emerging advanced industrial technologies on the overall industrial development of the country;

d. elaborate on necessary measures to accelerate proper development and strengthening of technological capabilities in the short-, medium- and long-term perspectives with the required financial and manpower resources.

C. Organization

The National Workshop which was organized from 12-14 December 1983 in Kuala Lumpur was attended by some 150 participants from Malaysia, representing senior officials at managerial levels in the government, public and private enterprises, professional organizations and associations, scientific and technological institutions, development banks and financing institutions, universities and other academic organizations. A list of the participants is attached as Annex I to the Report. The programme of the meeting is attached as Annex II.

Mr. Y.M. Raja Tan Sri Mohar bin Raja Badiozaman, Chairman, Coordinating Council for Industrial Technology Transfer welcomed the participants on behalf of one of the sponsors. He thanked UNDP and UNIDO for their active support and assistance in organizing the Workshop. He mentioned that the process of technology transfer, if left unregulated and if not properly planned, could result in random and unorganized technology development which may even lead to exploitation incompatible with the national objectives. He emphasized that technology policies and plans are to be considered as important tools for effective technology transfer and have to be ensured that these fulfill the aspirations of the country.

He further stressed the importance of encouraging internal development and transfer by local research organizations, as this would promote local technology generating capabilities and thus reduce the technological dependency to the maximum extent possible from abroad. He felt that technology transfer policies and plans should also take this aspect into account. He went on to mention that recognizing the importance of technology transfer in the process of the country's industrialization, the government has established the Coordinating Council for Industrial Technology Transfer, and that Council is now in the process of formulating technology transfer policies and plans. Towards this end, a committee of the Council has been set up to identify economic priority sectors, make review and comparative analysis of technology transfer strategies, mechanisms, infrastructure of other countries and to assess existing local technology. This Workshop was therefore very timely and

he had no doubt, judging from the topics to be discussed, that it could provide useful inputs into their efforts in the development of technology transfer policies and plans.

The Head of Development and Transfer of Technology Branch made a statement on behalf of UNIDO. He stated that the present meeting has its main purpose to create awareness of technology transfer problems among decision makers and senior officials in the government as well as in various public and private enterprises, organizations, institutions and universities, and to identify through the interaction of all participants in a brain-storming manner, appropriate measures to cope with those problems. The Workshop covered policies and planning mechanisms; strategies and case studies in technology transfer; regulations and incentives; infrastructure and licensing; human resources development etc. and case studies from Japan and Republic of Korea to supplement and complement the topics with practical examples. Through presentations on the subjects, panel discussions and questions and answers, he hoped that the Workshop would be able to provide useful guidance to the Government of Malaysia in promoting their industrial technology development policies and programmes systematically, by identifying and analysing the problems associated with the development, transfer and management of technology. He further expressed his hope that in the three (3) days of discussions, the government authorities would have a sound basis for formulating national technology development strategy, policies and plans, in line with the overall economic and industrial development strategy, as well as, the "look-east" policy being promoted by the Government.

Mr. Y.Y. Kim, Regional Representative of UNDP expressed his happiness to see that this Workshop was structured to cover extensively various aspects of technology transfer, built up around case studies. He had quickly gone over with his thoughts and illustrated the following <u>"misconceptions"</u> on the transfer of technology:

a. Science and technology is not something that can be packed with any other commodity and disperse by the industrially advanced countries along with other foreign aid to the developing countries;

b. Dependence on foreign technology may be substantially reduced or even eliminated through the development and strengthening of indigenous science and technology at universities and research laboratories;

c. Government-to-government or multilateral aid programmes can provide useful assistance in the development of indigenous science and technology at universities and research laboratories, which in turn can be transferred into the production sectors: and

d. Industrial technology can be developed at university laboratories and industrial research institutes and can replace industrial systems which have been traditionally supplied by foreign enterprise sources.

He wished the Workshop every success it deserved.

His Excellency Mr. Y.B. Datuk Amar Stephen Yong, Minister of Science, Technology and Environment welcomed the participants and resource persons at the opening ceremony. The Minister expressed a special word of thanks to UNIDO for bringing in such an excellent group of resource persons, and indicated that the role of international agencies such as UNIDO and UNDP in the development of science and technology is of fundamental importance for developing countries in their efforts to progress further in science and technology.

He stressed that transfer of technology has been an important subject of discussion at various international foras providing a venue to new methods of achieving a more rapid progress of change. He was confident that the contributions to be made by the resource persons from abroad, particularly from Japan and Republic of Korea would lead to a better exchange of knowledge and experience, considering the great achievement made by these two countries in science and technology. He understood that in this Workshop there would be discussions relating to case studies in selected industrial sectors; the knowledge and experience in the development of heavy industry in Republic of Korea, he felt, could be benefical to the development

of Malaysian heavy industries; and the experiences of the Japan in the electrical and electronics industries would similarly give a better insight into the factors that could contribute to the development of the this industrial sector in Malaysia. His Ministry would continue to play its role in promoting the technology transfer process through formulation of sound technology plans and by helping to provide a guiding role in industrialization.

He then made some references to their national objectives on policies and plans of technology transfer, which he requested be taken into consideration by the Workshop as follows:

a. To encourage and increase the inflow of appropriate technology;
b. To encourage the development of indigenous technology as well as the transfer and applications of such technologies by research institutions, universities and other organizations;
c. To build up a strong pool of indigenous expertise;
d. To ensure that technology transfer arrangements are economically sound for the country;
e. To increase the capability for the manufacture of export-oriented products and services;
f. To achieve a supplementary development of local innovations and skills with the purpose of reducing external dependence.

At the first plenary session, the following Chairmen and Rapporteurs were nominated.

Session I: Policies and Planning

Chairman: Encik Abdullah Mohd Yusof, Controller, SIRIM

Session II: Mechanisms, Strategies and Case Studies in Technology Transfer

Chairman: Encik Burkhan Abdullah, Director, Industries Division, Ministry of Trade and Industry

Session III: Regulations and Incentives

Chairman: William Hiroshi Tanaka, UNIDO

Session IV: Case Studies

Chairman: Encik Ruslan bin Khatib, Deputy Director National Productivity Centre

Session V: Infrastructure and Licensing

Chairman: Mohinder Singh, National Council for Scientific Research and Development

Session VI: Human Resources

Chairman: Gregory Thong, Professor of Faculty of Economics and Administration, University of Malaya

Rapporteurs

Awaludin Shaharoan, University Technology of Malaysia
Chen Yuen Hung, Ministry of Science, Technology and Environment
Hashim Saipon, University Technology of Malaysia
Mahmood Md. Salleh, Ministry of Trade and Industry
Mansor b. Md. Isa, University of Malaya
Shukri Ismail, SIRIM
Zainal Abidin Ahmad, University Technology of Malaysia

Resource persons presented only the salient features of their papers for about 15-20 minutes each, assuming that the participants had read the papers prior to the presentation. Following their presentations, emphasis has put on the exchange of views, questions and answers and interactions of thoughts focusing on the subject themes. This exercise was able to identify the specific problems prevailing in Malaysia as well as to develop an approach intended to directly and indirectly solve the problems. The brain-storming exercise resulted into a set of recommendations which appear at the beginning of this Report.

D. REPORT

All the Chairmen, rapporteurs, resource persons and panelists took part in the preparation of this Report. The Report was presented and duly adopted prior to the closing ceremony on 14 December 1983.

III. PLENARY SESSIONS

The following themes were presented at the Plenary Sessions and discussed.

Theme 1	Technology Transfer Policies and Planning as 'Tools' for Industrial Development
Theme 2	Internal Transfer and Technology Transfer from Abroad - Japanese Experience
Theme 3	Technology Transfer Policies and Planning - Japanese Experience
Theme 4	Assessment and Evaluation of Technology Needs in Relation to National and Socio-Economic Priorities
Theme 5	Overview of Existing Guidelines on Regulation of Technology Transfer
Theme 6	Incentives for Indigenous Technology Development and Importation of Technology
Theme 7	Regulations for Technology Transfer in Malaysia
Theme 8	Case Study of Japanese Experience of Technology Transfer in Electrical/Electronic Industry
Theme 9	Case Study of Korean Experience of Technology Transfer in Heavy Industry
Theme 10	Technology Transfer Issues - Malaysian Experience
Theme 11	Technology Transfer through Licensing and Joint Ventures
Theme 12	Internal Technology Transfer - Role of Research Institutes, Technology Transfer Agents and Universities in Relation to Commercialization of Technology
Theme 13	Industrial Infrastructure in relation to Technology Transfer
Theme 14	Skills Development for Technology Transfer

The list of papers is attached as Annex III.

Closing Ceremony

After the working sessions I to IV, four panelists presented their observations and comments on the various themes covered during the sessions.

Mr. Encik Nik Mohamed Amin bin Nik Abu Bakar, Secretary-General, Ministry of Science, Technology and the Environment made the following remarks at the closing ceremony. He felt that the Workshop was successful and thanked all the participants at the Workshop for their active participation. He also expressed his gratitudes to the resource persons from Republic of Korea and Japan, who had positively contributed to the Workshop by sharing their country experiences with the Malaysian experts. He further assured that the suggestions and recommendations proposed by the Workshop would be taken into due consideration when they modify their national technology policies and plans. He noted that the discussions offered during the 3 days had helped to identify problems, set objectives and place priorities that would guide the government to consider programmes and incentivies necessary to stimulate the acquisition of appropriate technologies suitable for and responding to the needs for the creation of a dynamic and fast-growing industrial sector. The governmental role in the general technology transfer processes, he observed, can be viewed as services that the government can offer to strengthen and facilitate the linkage between the buyer of technology and the supplier of technology. These linkages has to be supported by R+D organizations as well as the proper and adequate supply of technical information from science and technology institutions and information centres. Other measures such as the development of science and technological infrastructures, as well as legal measures taken to encourage the inflow of technology,has to be parallely supported by the presence of a mechanism for technology assessment and evaluation.
In conclusion, he was pleased that the Workshop had stimulated discussions on the formulation of a technology transfer policies and plans, and promised that his Ministry would appropriate the suggestions and recommendations made by the Workshop. He finally expressed his hopes that he can continue to communicate with the participants on problems he might be encountering in trying to interpret the policies designed to achieve a higher-level development of their industrialization programme.

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WORK PROGRAMME

12 December 1983 (Monday)	
9.05	Welcome Address by Y.M. Raja Tan Sri Mohar bin Raja Badiozaman Chairman, Coordinating Council for Industrial Technology Transfer
9.10	Address by Mr. William Hiroshi Tanaka, Head, Development and Transfer of Technology Branch, UNIDO
9.20	Address by Mr. Yoon Yul Kim, Regional Representative, UNDP
9.30	Keynote Address by Y.B. Datuk Amar Stephen Yong, Minister of Science, Technology and Environment
10.30-12.30	SESSION I: POLICIES AND PLANNING (Chairman: Encik Abdullah Mohd. Yusof, Controller, SIRIM)
10.30-11.00	Theme 1: Technology Transfer Policies and Planning as 'Tools' for Industrial Development (Mr. William Hiroshi Tanaka)
11.00-11.30	Discussion
11.30-12.00	Theme 2: Internal Transfer and Technology Transfer from Abroad: Japanese Experience (Professor Masaru Saito)
12.00-12.30	Discussion
14.00-16.30	SESSION II: MECHANISMS, STRATEGIES AND CASE STUDIES IN TECHNOLOGY TRANSFER (Chairman: Encik Burkhan Abdullah, Director, Ministry of Trade and Industry)
14.00-14.30	Theme 3: Technology Transfer Policies and Planning: Japanese Experience (Professor Masaru Saito)
14.30-15.00	Discussion
15.30-16.00	Theme 4: Assessment and Evaluation of Technology Needs in Relation to National and Socio-Economic Priorities (Professor S.J. Hahn)
16.00-16.30	Discussion
13 December 1983 (Tuesday)	
9.00-10.30	SESSION III: REGULATIONS AND INCENTIVES (Chairman: Mr. William Hiroshi Tanaka)
9.00-9.20	Theme 5: Overview of Existing Guidelines on Regulation of Technology Transfer (Encik Burkham Abdullah)

9.20-9.40	Theme 6: Incentives for Indigenous (Internal) Technology and Importation (External) of Technology (Mr. Han Woung Pack, UNIDO)
9.40-10.00	Theme 7: Regulations for Technology Transfer in Malaysia (Dr. Chee Peng Lim, Associate Professor, Faculty of Economics and Administration, University of Malaya)
10.00-10.30	Discussion
11.00-13.00	SESSION IV: CASE STUDIES (Chairman: Mr. Ruslan bin Khatib, Deputy Director, National Productivity Centre)
11.00-11.30	Theme 8: Case Study of Japanese Experience of Technology Transfer in Electrical/Electronics Industry (Prof. Shigeichi Moriguchi)
11.30-12.00	Theme 9: Case Study of Korean Experience of Technology Transfer in Heavy Industry (Professor Zae Quan Kim)
12.00-12.30	Theme 10: Technology Transfer Issues: Malaysian Experience (Dr. Rahim Bidin, Director of Research, SIRIM)
12.30-13.00	Discussion
14.00-15.00	SESSION V: INFRASTRUCTURE AND LICENSING (Chairman: Dr. M. Mohinder Singh, National Council for Scientific Research and Development)
14.00-14.30	Theme 11: Technology Transfer through Licensing, Joint Ventures, Turnkey, etc. (Mr. Han Woung Pack)
14.30-14.50	Theme 12: Internal Technology Transfer - Role of Research Institutes, Technology Transfer Agents and Universities in Relation to Commercialization of Technology (Prof. S.J. Hahn)
14.50-15.10	Theme 13: Industrial Infrastructure in Relation to Technology Transfer (Mr. Han Woung Pack)
15.10-15.30	Discussion
16.00-17.00	Discussion
14 December 1983 (Wednesday)	
9.00-10.00	SESSION VI: HUMAN RESOURCES (Chairman: Prof. Gregory Thong, Faculty of Economics and Administration, University of Malaya)
9.00-9.20	Theme 14: Skills Development for Technology Transfer (Mr. William Hiroshi Tanaka)

9.20-10.00	Discussion
10.30-12.30	PANEL DISCUSSION (Chairman: Dr. Mohamad Yusof Ismail, Director, Industry Division, Economic Planning Unit) Panelists: Tan Sri Datuk Haji Mohd. Hassan bin Wahad, President, Industrial Engineering Management Association (IEM) Dr. Seang Jae Yu, Chief Technical Adviser to MIDA Industrial Plan, MIDA Prof. Dr. Nik Abdul Rashid Ismail Deputy Vice Chancellor University Kebangsaan Malaysia Prof. Gregory Thong Faculty of Economics and Administration University of Malaya
14.30-16.00	Specific Suggestions and Recommendations and Adoptions of a Draft Report (Chairman: Dr. Ahmad Zaharudin Idrus, Secretary, National Council for Scientific Research and Development)
16.00-16.15	Closing Ceremony: Address by Encik Nik Mohamed Amin bin Nik Abu Bakar, Secretary-General, Ministry of Science, Technology and the Environment

ANNEX IIII

LIST OF PAPERS PRESENTED AT THE WORKSHOP

Main papers

1. Technology Transfer Policies and Planning as 'Tools' for Industrial Development

   by: Mr. William Hiroshi Tanaka

2. Internal Transfer and Technology Transfer from Abroad: Japanese Experience (ID/WG.410/3)

   by: Prof. Masaru Saito

3. Technology Transfer Policies and Planning: Japanese Experience

   by: Prof. Masaru Saito

4. Assessment and Evaluation of Technology Needs in Relation to National and Socio-Economic Priorities (ID/WG.410/2)

   by: Prof. S.J. Hahn

5. Overview of Existing Guidelines on Regulation of Technology Transfer

   by: Mr. Encik Burkham Abdullah

6. Incentives for Indigenous (Internal) Technology and Importation (External) of Technology

   by: Mr. Han Woung Pack

7. Regulations for Technology Transfer in Malaysia

   by: Dr. Chee Peng Lim

8. Case Study of Japanese Experience of Technology Transfer in Electrical/Electronic Industry (ID/WG.410/1)

   by: Dr. Shigeichi Moriguchi

9. Case Study of Korean Experience of Technology Transfer in Heavy Industry (ID/WG.410/4)

   by: Prof. Zae Quan Kim

10. Technology Transfer Issues - Malaysian Experience

    by: Dr. Rahim Bidin

11. Technology Transfer Through Licensing, Joint Ventures, Turnkey, etc.

    by: Mr. Han Woung Pack

12. Internal Technology Transfer - Role of Research Institutes, Technology Transfer Agents and Universities in Relation to Commercialization of Technology (ID/WG.410/5)

    by. Prof. S.J. Hahn

13. Industrial Infrastructure in Relation to Technology Transfer

    by: Mr. Han Woung Pack

14. Skills Development for Technology Transfer

    by: Mr. William Hiroshi Tanaka

Panelist Discussion Papers

1. Government Policies on Technology Transfer

   by: Mr. Tan Sri Datuk Haji Mohd Hassan Bin Abdul Wahab

2. Manpower Development for Technology Transfer

   by: Prof. Gregory T.S. Thong

3. Technology Transfer Policies and Planning

   by: Mr. Seongjee Yu

4. The Role of Universities in Technological Development and Transfer

   by: Mr. Nik A. Rashid Ismail